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1. A supported catalyst for producing a syndiotactic styrenic polymer, which comprises:
- 5 (A) a support with a high-surface area;
(B) a polymer coated onto the support; and
(C) a homogeneous transition metal compound as essential component;
wherein the polymer functions an insulation layer between the support and the metal compound.
- 10 2. The supported catalyst of claim 1 in which said polymer is harmless to catalyzation performances, interactive with the catalyst and support, and insoluble in the styrenic monomer or polymerization solvent after the catalyst is loaded.
- 15 3. The supported catalyst of claim 1 in which said polymer contains polar groups.
4. The supported catalyst of claim 1 in which said polymer is selected from the group consisting of acrylonitrile-containing polymers and copolymers, hydroxyl group-containing polymer and copolymers, acrylic and acrylate polymers and
- 20 copolymers, maleic anhydride-containing copolymers and maleic anhydride modified polymers, acetate containing polymers and copolymers, polyethers, polyketones, polyamide polymer and copolymers, and polyurethanes.
5. The supported catalyst of claim 4 in which said acrylonitrile-containing polymer or copolymer is selected from the group consisting of polyacrylonitrile, acrylonitrile-styrene block copolymer, styrene-acrylonitrile random copolymer, acrylonitrile-butadiene-styrene resin, acrylonitrile-butadiene random copolymer, and acrylonitrile-isoprene random copolymer.
- 25 6. The supported catalyst of claim 5 in which said styrene-acrylonitrile random

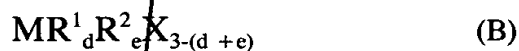
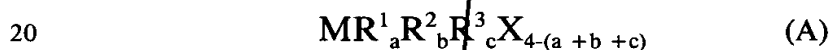
copolymer has a degree of polymerization of at least 5 and contains about 0.1 to 100 % by weight of acrylonitrile.

7. The supported catalyst of claim 1 in which said polymer is about 0.0001 to 99.999 % by weight.

8. The supported catalyst of claim 1 in which said support is an organic material selected from the group consisting of poly(styrene-co-divinylbenzene) bead, starch powder and polyolefin powder.

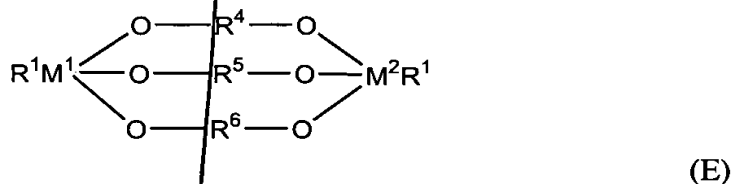
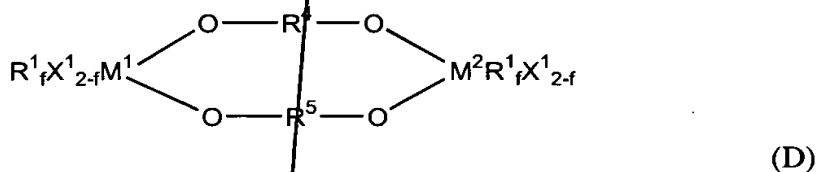
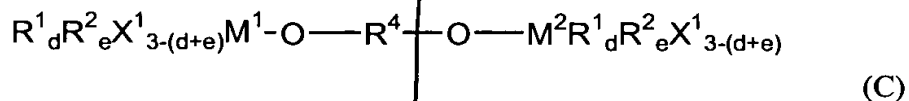
9. The supported catalyst of claim 1 in which said support is an inorganic material selected from the group consisting of silica gel, alumina, silica-alumina gel, zeolite, mica powder, clays, molecular sieves, metal oxide compounds, metal halogenides, metal carbonates and metal powder.

10. The supported catalyst of claim 1 in which said homogeneous transition metal compound is a metal compound of Group IVB represented by the following formula (A) or (B):



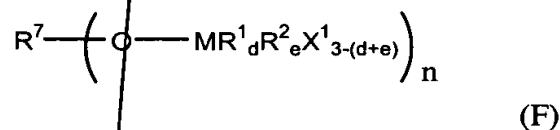
where M is an atom of Group IVB, R^1 , R^2 and R^3 are a hydrogen atom, an alkyl group having 1 to 20 carbon atoms, an alkoxy group having 1 to 20 carbon atoms, an aryl group having 6 to 20 carbon atoms, an alkylaryl group having 6 to 20 carbon atoms, an arylalkyl group having 6 to 20 carbon atoms, an aryloxy group having 1 to 20 carbon atoms, a cyclopentadienyl group, a substituted cyclopentadienyl group or an indenyl group, X is a halogen atom, a, b and c are an integer of 0 to 4, and d and e are an integer of 0 to 3.

11. The supported catalyst of claim 1 in which said homogeneous transition metal compound is a binuclear catalyst represented by the following formula (C), (D) or (E):



10 where M^1 and M^2 are an atom of Group IVB, R^1 , R^2 , R^4 , R^5 and R^6 are an alkyl group having 1 to 20 carbon atoms, an aryl group having 6 to 20 carbon atoms, an alkylaryl group having 6 to 20 carbon atoms, an arylalkyl group having 6 to 20 carbon atoms, a cyclopentadienyl group, a substituted cyclopentadienyl group or an indenyl group, X is a halogen atom, d and e are an integer of 0 to 3, and f is an integer of 0 to 2.

12. The supported catalyst of claim 1 in which said homogeneous transition metal compound is a multiple-nuclear catalyst represented by the formula (F):



where M is an atom of Group IVB, R¹ and R² are an alkyl group having 1 to 20 carbon atoms, an aryl group having 6 to 20 carbon atoms, an alkylaryl group having 6 to 20 carbon atoms, an arylalkyl group having 6 to 20 carbon atoms, a cyclopentadienyl group, a substituted cyclopentadienyl group or an indenyl group, R⁷ is an alkyl group having 1 to 20 carbon atoms, an aryl group having 6 to 20 carbon atoms, an alkylaryl group having 6 to 20 carbon atoms, an arylalkyl group having 6 to 20 carbon atoms, or a polymer having a polymerization degree of 5 to 10000, X is a halogen atom, d and e are an integer of 0 to 3, and n is an integer of 3 to 1000.

13. The supported catalyst of claim 1 in which said polymer is about 0.0001 to 30 % by weight.

14. The supported catalyst of claim 1 further comprising (D) alkyl aluminoxane and/or (E) alkyl aluminum compound.

15. A method of preparing a supported catalyst for producing a syndiotactic styrenic polymer, which comprises:

providing a support precursor by drying the slurry of a support with a high-surface area, a polymer to be coated onto the support, and a solvent; and adding a homogeneous transition metal compound and a solvent to the support precursor.

16. The method of preparing a supported catalyst according to claim 15, which further comprises:

adding alkyl aluminoxane and/or alkyl aluminum compound to the slurry prior to the second step.

17. A method of producing a syndiotactic styrenic polymer, which comprises using a supported catalyst comprising a support with a high-surface area, a polymer

coated onto the support, and a homogeneous transition metal compound as essential component, the polymer functions an insulation layer between the support and the metal compound.

- 5 18. A method of producing a syndiotactic polymer, which comprises using a supported catalyst comprising a support with a high-surface area, a polymer coated onto the support, and a homogeneous transition metal compound as essential component, the polymer functions an insulation layer between the support and the metal compound.

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19. The method of producing a syndiotactic polymer according to claim 18 wherein said syndiotactic polymer is styrenic polymer, olefin polymer or styrene-olefin copolymer.

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